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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/573,913

03/30/2006

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Y0647.0160

5115

32172 7590 03/29/2010
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EXAMINER

THIRUGNANAM, GANDHI

ART UNIT

PAPER NUMBER

2624

MAIL DATE

DELIVERY MODE

03/29/2010

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/573,913	Applicant(s) ISHIYAMA, RUI	
	Examiner GANDHI THIRUGNANAM	Art Unit 2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 November 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-33 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-14, 16, 17, 21-25, 27, 28, 32 and 33 is/are rejected.
- 7) ☒ Claim(s) 15, 18-20, 26 and 29-31 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Remarks

1. The response received on 21 November 2009 has been placed in the file and was considered by the examiner. An action on the merits follows.

Claims 1-33 are pending.

The Examiner withdraws the Objection to Fig. 14 of the Drawings

The Examiner withdraws the Objection to the Specification.

The Examiner withdraws all Objections to the claims.

The Examiner withdraws the 35 USC 101 Rejections of claim 23.

Response to Arguments

2. Applicant's arguments filed 21 November 2009 have been fully considered but they are not persuasive.

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3. Applicant argues that Applicant Admitted Prior Art (AAPA) does not teach or suggest the limitation "image positional relationship detection means for detecting, for each sub-region having a predetermined size, of the comparison image, a positional relationship between the input image and the comparison image generated by said comparison image generation means;".

AAPA (pg. 2 lines 6-15) discloses a "posture candidate group determination means" which determines a "plurality of position/posture estimation value groups" (sub-regions) by changing six position/posture parameters. The six position/parameters are the "X-, Y- and Z- directions and angle parameters X-, Y- and Z- axes". These sub-regions are generated for the "input image data"

AAPA (pg. 2 Lines 16- pg. 3 Line 2) discloses "the comparison image generation means" generates a "comparison image group" (comparison sub-region images) under the same illumination conditions as the input image data, using the 3D shape model data of the target object, a base texture group and "the position/posture corresponding to each position/posture estimation value group" (area defining the location of the target image sub-regions). This discloses a positional relationship between the input image and the comparison image.

4. In particular Applicant argues "AAPA does not detect, for each sub region of the comparison image, a positional relationship between the input image and the comparison image. The Office Action attempted to read the recited sub region on the entire "target object" of the AAPA. Amended claim 1 makes it even more clear that the sub region is a sub region of the comparison image, and is not

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the entire target image. For at least the foregoing reason, amended claim 1 is believed patentable over the AAPA.”

The Examiner disagree’s with Applicant’s argument that the currently amended claim language recites a sub-region of the comparison image.

The amendment to the claim language is unclear and can be read in atleast two different ways.

(1) detecting, for each sub-region of the comparison image having a predetermined size, a positional relationship between the input image and the comparison image. (each sub-region of the comparison image having a predetermined size) OR

(2) detecting for each sub-region having a predetermined size of the comparison image, a positional relationship between the input image and the comparison image. (the sub region has the size of the comparison image), which would mean there would be only one sub-region.

In the case where the sub-region is a sub region of the comparison image, the entire "target object" of AAPA still reads on the claim under this interpretation, as the “target object” is only a sub-region of the entire comparison image. An image of an object includes the object as well as pixels which represents portions not of the object (for example empty space).

5. From reading Applicant’s arguments, The Examiner suggests adding a limitation “image displacement distribution means segments the comparison image generated by

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the comparison image generation means into partial images each corresponding to a sub-region with a predetermined size”.

And changing the “image positional relationship detection means” to “image positional relationship detection means for detecting, for each sub region, a positional relationship between the input image and the comparison image generated by said comparison image generation means”

This would appear to properly claim what Applicant is arguing, as it would clarify that the comparison image is segmented into sub-regions and for each sub-region a positional relationship is detected.

This would appear to overcome AAPA, as there would be a plurality of sub-regions of the comparison image, each with a predetermined size, as AAPA discloses a single sub-region of a predetermined size.

Claim Rejections - 35 USC § 112

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. Claims 1-11 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 Lines 9-11 recites “image positional relationship detection means for detecting, for each sub-region having a predetermined size, of the comparison image, a

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positional relationship between the input image and the comparison image generated by said comparison image generation means;”

This limitation is unclear. Does Applicant intend (1) detecting for each sub-region of the comparison image having a predetermined size? OR (2) detecting for each sub-region having a predetermined size of the comparison image. (the comparison image is the predetermined size)

Claims 2-11 are rejected as being dependent on a rejected claim.

Claim Rejections - 35 USC § 102

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

9. Claims 1-2, 6, 11-13, 17, 22-24, 28 and 33 are rejected under 35 U.S.C. 102(a) as being anticipated by AAPA (Applicant's Admitted Prior Art), hereafter referred to as AAPA.

Regarding **claim 1** as best understood, AAPA discloses an estimation system for estimating an object state, characterized by comprising:

image input means for inputting an input image containing an object whose state is to be estimated, the state being at least one of a position and posture; (AAPA, pg. 2 Lines 2-9, *"Input Image Data containing image of an object As a position/posture estimation ..."*)

3D shape data storage means for storing 3D shape data of the object; (AAPA, pg. 2 Line 16, *"3D shape model data"*)

comparison image generation means for generating, as a comparison image, an image containing the object in a predetermined state by using the 3D shape data stored in said 3D shape data storage means; (AAPA, pg. 2 Line 20 – pg. 3 Line 2 *"the comparison image generation means 920 generates illumination variation space data which represents an image variation caused by a change in illumination condition when the target object has a position/posture corresponding to each position/posture estimation value group. The comparison image generation means 920 generates a comparison image group under the same illumination condition as that for the input image data 91 on the basis of the illumination variation space data", where the predetermined state is the first underlined section and comparison image is the comparison image group.*

Note: the "comparison image generation means" generates an image from the 3D model. An image comprises the model object as well as space where the model

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object has not been defined as empty space. The object in the image would be the sub-region.)

image positional relationship detection means for detecting, for each sub-region having a predetermined size, of the comparison image, a positional relationship between the input image and the comparison image generated by said comparison image generation means; (AAPA, pg. 2 lines 6-15, *where the initial target image has parameters containing known errors, where the parameters are X, Y, Z-axis directions and X, Y, and Z-axes angle parameters, and the comparison images are created by "changing six position/posture parameters (3D parameters ... contained by the position/posture initial value by a predetermined variation" where the position relationship is based on the predetermined variation. The sub-region is the "target object" which has the predetermined size as the same as in the 3D shape model data*)

correction amount calculation means for calculating a correction amount of the object state in the comparison image by using the positional relationship detected by said image positional relationship detection means; and (AAPA, pg. 3 Lines 3-7, *where the optimum position/posture estimation value is the correction amount*)

state correction means for correcting the object state set in comparison image generation by said comparison image generation means by using the correction amount obtained by said correction amount calculation means, thereby calculating a new object state. (AAPA, pg. 3 Lines 7-18, *"the end determination means replaces the optimum position/posture estimation value with the position/posture estimation initial value and*

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outputs the value ...”, where the new object state is the new optimum position/posture estimation value)

Claims 12 and 23 as best understood are rejected under the same reasoning as claim 1 above.

Regarding **claim 2**, AAPA discloses the estimation system for estimating an object state according to claim 1, further comprising state determination means for determining on the basis of the correction amount obtained by said correction amount calculation means whether the object state set by said comparison image generation means is appropriate, (AAPA (pg. 3 Lines 3-14))

wherein when it is determined that the object state is appropriate, the object state set by said comparison image generation means is output as an estimation value, and (AAPA (pg. 3 Lines 3-14))

when it is determined that the object state is not appropriate, estimation processing including the comparison image generation processing by said comparison image generation means, the positional relationship detection processing by said image positional relationship detection means, and the correction amount calculation processing by said correction amount calculation means is executed again by setting the new object state calculated by said state correction means to the predetermined state. (AAPA (pg. 3 Lines 3-14), based on if there is “room for improvement of the similarity of the comparison” the object is either output or the new optimum position/posture estimation value replace the initial value (or current position estimation

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value))(AAPA (pg. 3 lines 14-17) discloses “repeatedly executes the above-described processing until the similarity of the comparison image cannot be improved”)

Claims 13 and 24 are rejected under the same reasoning as claim 2 above.

Regarding **claim 6**, AAPA discloses the estimation system for estimating an object state according to claim 1, wherein said comparison image generation means comprises: means for reproducing a luminance value of an object surface, which changes depending on an illumination condition; and (AAPA, pg. 2 lines 16-25, “illumination variation space data”)

means for generating the comparison image under an illumination condition close to that for the input image by using the reproduced luminance value. (AAPA, pg. 2 line 25- pg. 3 line 2, “comparison image group under the same illumination condition ...”)

Claims 17 and 28 are rejected under the same reasoning as claim 6 above.

Regarding **Claim 11**, AAPA discloses the estimation system for estimating an object state according to claim 1, further comprising

feature extraction means for extracting an image feature amount of each of the input image and comparison image on the basis of luminance values of the input image and the comparison image generated by said comparison image generation means, wherein said image positional relationship detection means detects the positional relationship between the input image and the comparison image for each sub-region on the basis of the image feature amount extracted by said feature extraction means.

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(AAPA, pg. 2 lines 2-15, where the image data contains luminance values, the target object is the feature that is extracted from the target image and the comparison image means, and the shape model data is compared to the feature amounts (object) (pg. 2 lines 16-25)

Claims 22 and 33 are rejected under the same reasoning as claim 11 above.

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. Claims 3, 14 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over AAPA in view of Burtnyk (Patent 5,471,541), hereafter referred to as Burtnyk.

Regarding **claim 3**, AAPA discloses the estimation system for estimating an object state according to claim 2, but does not disclose

“wherein said state determination means determines that the object state is appropriate when the correction amount obtained by said correction amount calculation means is smaller than a predetermined amount, and determines that the object state is not appropriate when the correction amount is not smaller than the predetermined amount.” *(AAPA discloses determining whether the object state is appropriate based on room for improvement, but does not disclose specifically how it is done, Burtnyk Col. 4*

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Lines 49-50 discloses the well known method of comparison of a correction amount with a threshold)

It would have been obvious to one of ordinary skill in the art at the time of invention to modify AAPA with Burtnyk for the purpose of creating a stop condition in an iterative process.

Claim 14 and 25 are rejected under the same reasoning as claim 3 above.

12. Claims 5, 16 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over AAPA in view of Yang (Patent 6,580,810), hereafter referred to as Yang.

Regarding **claim 5**, AAPA discloses an estimation system for estimating an object state according to claim 1, but does not disclose

“wherein said image input means comprises means for inputting a moving image containing an object, and said image positional relationship detection means uses a latest frame image of the moving image as the input image.” (*Yang, Abstract*)

It would have been obvious to one of ordinary skill in the art at the time of invention to modify AAPA with Inoue for the purpose of estimating a moving object.

Claims 16 and 27 are rejected under the same reasoning as claim 5 above.

Allowable Subject Matter

13. Claims 4, 7-10 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

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14. **Claims** 15, 18-20, 26 and 29-31 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

15. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to GANDHI THIRUGNANAM whose telephone number is (571)270-3261. The examiner can normally be reached on M-Th, 7:30am to 6pm, EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bhavesh M. Mehta can be reached on 571-272-7453. The fax phone

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number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Gandhi Thirugnanam/
Examiner, Art Unit 2624

/Wenpeng Chen/
Primary Examiner, Art Unit 2624